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The piston includes seals 101 that prevent fluid flow across the seals 101 between the outside of the piston 99 and the inside of the valve sleeve 91. The piston 99 controls fluid flow through the valve sleeve 91 by selectively opening and closing fluid flow through the flow ports 95 as the piston 99 slides within the valve sleeve 91. The valve sleeve 91 also includes a vent port 103 that allows the pressure inside of the valve sleeve to adjust with the movement of the piston 99.

[0015] As shown in FIGURE 1, the flowbore fluid temperature control system 85 further comprises an actuator mechanism 89, which comprises a spring 117 adapted to compress with the movement of the piston 99. The actuator mechanism 89 may also be comprise any other type of actuator for controlling the valve mechanism 87. For example, the actuator mechanism 89 may comprise a mechanical actuator such as a spring, an electrical actuator such as an electric motor, or a hydraulic actuator such as a hydraulic piston. The actuator mechanism ~~8-89~~ may also be an apparatus that places the ball, sleeve, bar, or other single position restrictive device into the flowbore.

[0017] The operating system also selectively decreases the fluid pressure within the flowbore 79. Compressing the spring 117 creates a second load on the piston 99 from the spring 117. A decrease in the fluid pressure within the flowbore 79 allows the spring 117 to expand and thus move the piston 99 in the opposite direction of the fluid flow 86. As the spring 117 moves the piston 99, the piston 99 moves axially within the valve sleeve 91 and selectively closes flow ports 95 to produce a desired flow rate. Moving the piston 99 axially within the valve sleeve 91 also moves the ratchet lug 113 within the ratchet sleeve groove 107. As the spring 117 moves the piston 99 axially, the ratchet lug 113 moves to one of the first positions 109, rotating the piston 99 within the valve sleeve 91. Once the ratchet lug 113 reaches one of the selected first positions ~~111-109~~, the piston 99 is prevented from moving further axially. Thus, any further decrease in fluid pressure within the flowbore 79 will not allow the spring 117 to move the piston 99 any further.

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 [0018] ~~Not shown is an~~ An operating system that selectively operates the actuator mechanism 89 and controls the fluid pressure in the flowbore 79. The operating system of the flowbore fluid temperature control system 85 may comprise a fluid pump 200 located in the drill string 20 or on the surface 15 that controls the fluid pressure within the flowbore 79. The operating system thus operates the actuator mechanism 89, and thus controls the position of the piston 99, by controlling the fluid